Dam ID: HI00098
Alexander

Vulnerability Index:
Extreme 1 | High 2 | Moderate 3 | Low 4

Inspection No:
Date: 22 March 06

STATE OF HAWAII - DLNR
VISUAL DAM SAFETY INSPECTION SHEET

Inspection Type: Visual Dam Safety Inspection

Persons Present	Affiliation	Phone Number
Pat Fitzgerald	U.S. Army Corps of Engineers	
Dwayne Lillard, PE	U.S. Army Corps of Engineers	
Dickey H. Lee, PE	Dept. Land and Natural Resources	
Kevin L. Gooding, CPG	Dept. Land and Natural Resources	

Weather Condition: X Rain previous day ☐ Rainy ☐ Drizzle / Mist X Cloudy/Overcast ☐ Partly Cloudy ☐ Sunny ☐ Dry

Comments:

1. General: *(Information currently on file, update as required)*

Dam/Res. Name: Alexander
Owner: Kauai Coffee Company
Owner Contact: Mr. Kimo Texeira — Owner Ph.:
Lessee: — Lessee Ph.:
O & M Contractor: — O & M Ph.:
Nearest City: Wahiawa Camp 2 — Latitude: 21.96 ° (decimal)
County: Kauai — Longitude: 159.5267 ° (decimal)
Tax Map Key(s): (4)2-4-009:01

Dam Status	A:	Hazard Potential	H	Dam Size	
Year Completed	1931	Dam Length	600 ft.	Dam Height	113 ft.
Normal Storage	1070 ac.ft.	Max. Storage	2540 ac.ft.	Max. Surface Area	31.5 ac.
Offsite Drainage Area	2.86 mi.	Spillway Type		Max. Spillway Q	621 cfs

Owner owns land under dam facility:
Emergency Action Plan on file with the Department: No
Reports on file with the Department:

2. Questions for Owner's Rep.:	Yes	No	Unknown	Comments
Construction Plans Available	☐	☐	☐	
Site / Facility Map	☐	☐	☐	
Operation & Maintenance Manual	☐	☐	☐	
Emergency Action Plan	☐	☐	☐	
Modifications / Improvements	☐	☐	☐	
Conduct Routine Inspections	☐	☐	☐	
Conduct Routine Maintenance	☐	☐	☐	
Vehicle access to site	☐	☐	☐	☐ Not accessible ☐ With Standard car ☐ Requires 4-Wheel Drive
Access during heavy rains	☐	☐	☐	☐ Not accessible ☐ With Standard car ☐ Requires 4-Wheel Drive
Access when spillway is flowing	☐	☐	☐	☐ Not accessible ☐ With Standard car ☐ Requires 4-Wheel Drive
Other Studies Conducted	☐	☐	☐	☐ Phase I ☐ Phase II ☐ Hydraulics ☐ Stability ☐ Hazard ☐ Seismic
				☐ Other: _____
Incident History	☐	☐	☐	☐ Breached ☐ Overtop ☐ Slide ☐ Down stream Flooding
				☐ Other: _____
Reservoir's Current Use	☐	☐	☐	☐ Sediment ☐ Irrigation ☐ Recreation ☐ Flood Control ☐ Drinking Water
				☐ Power Generation ☐ Other: _____

Findings and Corrective Actions:

- ☐ a. The Owner shall maintain documentations including Construction plans, specifications, improvements, modifications, Operations and Maintenance Manuals and routine inspection logs for this dam facility.
- ☐ b. An Emergency Action Plan (EAP) is on file with the department, submit any updates as applicable.
- ☐ c. An EAP is required for High Hazard Dams. Submit an updated EAP for this facility.
- ☐ d. An EAP is recommended for all dams regardless of hazard class. Submit EAP if developed for the facility.
- ☐ e. Submit narrative and additional information detailing the improvements, modifications, and/or alterations at the dam site, unless covered by approved dam permit.
- ☐ f. Routine inspection logs were not inspected.
- ☐ g. Dam owners shall provide for routine inspection of the dam.
- ☐ h. The dam did not appear to be maintained on a regular basis.
- ☐ i. Access to site appears to be satisfactory.
- ☐ j. There is no vehicular access to the dam site. Operational and emergency plans need to reflect this deficiency or access provided.
- ☐ k. Access to dam is questionable during severe weather conditions and/or spillway overflows. Operational plans and emergency plans need to reflect this deficiency or access provided.
- ☐ l. Provide a detailed narrative of the incident, responses taken, and any damages incurred. Dam owners are required to promptly advise the department of any sudden or unprecedented flood or unusual or alarming circumstance or occurrences which may adversely affect the dam or reservoir.
- ☐ m. Submit current Operations and Maintenance Manual or Procedures for this dam / reservoir facility.
- ☐ n. Submit Site or Facility Map of this Dam which identifies the location of major features including outlet works controls and conduits.
- ☐ o. _____

Additional Requirements:

The following investigative study(s) are:

Required	Recommended	
☐	☐	Phase I Study
☐	☐	Phase II Study (Including ☐ Seepage ☐ Hydrology/Hydraulics ☐ EAP)
☐	☐	Hydrology and Hydraulics (including Probable Maximum Flood and spillway capacity)
☐	☐	Stability Analysis
☐	☐	Seismic Analysis
☐	☐	Hazard Classification
☐	☐	Other: _____

Physical Dam Features: (Check All Applicable. Provide description of Items Observed and/or Take Photos. Indicate photo # in description.)

3. Reservoir:

Level during inspection Approx. 8'-10' below dam crest _____ft per _____ (gage / other)

Normal Operating Level/Range _____ft per _____ (gage / other)

Description: _____

Typical Operation ☐ Spillway always flowing ☐ Kept within normal range ☐ Kept Empty ☐ Drained Daily ☐ Only filled by Storms

☐ Other: _____

Sinkhole in Res.: ☐ # Observed: _____ Size: _____ by _____ in. Deep ☐ Not Visible ☐ None Observed

Description: _____

Staff Gage: Description: _____

Findings:

x a. The reservoir was not inspected.

☐ b. The reservoir appeared to be in satisfactory condition, no corrective actions are required at this time.

☐ c. The reservoir appeared to be in fair to poor condition and requires corrective action.

☐ d. The reservoir appeared to be in unsatisfactory condition, urgent corrective action is required.

Corrective Actions:

☐ e. The staff gage needs maintenance and/or repair. Description:_____

x f. A staff gage was not observed at the reservoir. Provide some method of quantifying the water level within the reservoir.

☐ g. A sinkhole was observed in the upstream reservoir. Conduct additional investigations and monitoring to identify the cause, risk and appropriate action.

☐ h. USGS was installing a temporary gauge at the time of inspection.

4. Intake Works Description:

☐ Number of Intakes _____

☐ Intake Culvert / Pipe

Size: _____in. ☐ DIP ☐ Corrugated Metal ☐ PVC ☐ HDPE ☐ Concrete ☐ Other _____

Control: ☐ Gate ☐ Valve ☐ Flow can either be Shut off or Bypassed

From: ☐ Stream Diversion ☐ Pump ☐ Reservoir ☐ Other _____

☐ Ditch / Flume

Dimension: _____ (Size x Depth) Shape_____

Surface: ☐ Dirt ☐ Wood ☐ Concrete ☐ Lined w/_____

Control: ☐ Gate ☐ Valve ☐ Flow can either be Shut off or Bypassed

From: ☐ Stream Diversion ☐ Pump ☐ Reservoir ☐ Other _____

Findings:

x a. The intake works were not inspected.

☐ b. The intake works were not tested.

☐ c. The intake works appeared to be in satisfactory condition, no corrective actions are required at this time.

☐ d. The intake works appeared to be in fair to poor condition and requires corrective action.

☐ e. The intake works appeared to be in unsatisfactory condition, urgent corrective action is required.

Corrective Actions:

☐ f. The intake works needs maintenance and/or repair. Description: _____

☐ g. _____

5. Upstream Slope: **(Typical Slope ± IV : 3H)**

*Slope Protection: ☐ None ☐ Dumped Rock ☐ Fitted Rip Rap ☐ Grouted Rip Rap ☐ Liner _____ ☐ Other: _____

☐ Defect in Protection: Description: _____

Erosion: ☐ Loose soil w/ little vegetation ☐ Rut (<6") ☐ Gully (>6" deep) ☐ Not Visible x None Observed

Description: _____

Cracks: ☐ Parallel with crest ☐ Perpendicular to crest ☐ Slide visible ☐ Not Visible x None Observed

Description: _____

Sinkholes: ☐ # Observed: _____ Size: _____ and _____ Depth ☐ Not Visible x None Observed

Description: _____

Vegetation: ☐ None ☐ Low Ground Cover ☐ Bushes or Tall Grass ☐ Trees #_____ ☐ <6" ☐ >6" & <20" ☐ >20"

Description: _____

Findings:

☐ a. The upstream slope was not inspected.

☐ b. The upstream slope appeared to be in satisfactory condition, no corrective actions are required at this time.

x c. The upstream slope appeared to be in fair to poor condition and requires corrective action.

☐ d. The upstream slope appeared to be in unsatisfactory condition and not expected to fulfill its intended function. Urgent corrective action is required.

Corrective Actions:

☐ e. Slope protection needs maintenance or repair. Description:_____

☐ f. Rut and/or Gully erosion was observed on the slope, which requires maintenance and/or repair. Description:_____

☐ g. A crack was observed on the slope, which requires further investigation to determine the underlining cause. Monitor the area and/or repair as required.

☐ h. A sinkhole was observed on the slope, which requires further investigation to determine the underlining cause. Repair and monitor the area.

x i. The upstream slope was not visible due to high grass and bush vegetation. Clear high vegetation and maintain low to enable easy visual inspection.

☐ j. Tree(s) were observed on the dam embankment. Trees have been identified as the probably cause of piping failures, and can possibly cause sever damage to the embankment if they are uprooted during a high winds. Corrective action is required to remove the tree hazards from the dam. Acceptable remedies include removal of the tree and its root structure down to a 2" diameter and reconstructing the damaged embankment section. All repair work shall be accomplished as per the requirements of licensed geotechnical or structural engineer. Routinely monitor the damaged area for signs of settlement and seepage.

k. _____

* Cross sections of the embankment indicate "Hand Placed Riprap" extending from elev. 1565 feet to crest of dam (elev. 1605 feet).

6. Crest: Approximate Crest Width: **30 feet (shown on drawings)**

Access: ☐ None ☐ Walking Path x Roadway, Surface / Width / Usage: Earth

Erosion: ☐ Loose soil w/ little vegetation x Rut (<6") ☐ Gully (>6" deep) ☐ Not Visible ☐ None Observed

Description: Several ruts observed with ponded water from rainfall.

Cracks: ☐ Parallel with crest ☐ Perpendicular to crest ☐ Slide visible ☐ Not Visible x None Observed

Description: _____

Sinkholes: ☐ _____ in. Wide x _____ in. Long x _____ in. Deep ☐ Not Visible x None Observed

Description: _____

Vegetation: ☐ None ☐ Low Ground Cover x Bushes or Tall Grass x Trees # many X <6" X >6" & <20" ☐ >20"

Description: Vegetation noted along shoulders of crest with trees noted along downstream shoulder.

Findings:

☐ a. The dam crest was not inspected.

☐ b. The dam crest appeared to be in satisfactory condition, no corrective actions are required at this time.

x c. The dam crest appeared to be in fair to poor condition and requires corrective action.

☐ d. The dam crest appeared to be in unsatisfactory condition and not expected to fulfill its intended function. Urgent corrective action is required.

Corrective Actions:

☐ e. Access along the crest was satisfactory.

☐ f. Access along the crest was not possible. Description: _____

x g. Rut and/or Gully erosion was observed on the crest, which requires maintenance and/or repair. Description: Crest road should be graded and ruts filled to prevent ponding of water

h. A crack was observed on the crest, which requires further investigation to determine the underlining cause. Monitor the area and/or repair as required.

☐ i. A sinkhole was observed on the crest, which requires further investigation to determine the underlining cause. Repair and monitor the area.

x j. Portions of the crest were not visible due to high grass and bush vegetation. Clear high vegetation and maintain low to enable easy visual inspection.

☐ k. Tree(s) were observed along the dam crest. Trees have been identified as the probably cause of piping failures, and can possibly cause sever damage to the embankment if they are uprooted during a high winds. Corrective action is required to remove the tree hazards from the dam. Acceptable remedies include removal of the tree and its root structure down to a 2" diameter and reconstructing the damaged embankment section. All repair work shall be accomplished as per the requirements of licensed geotechnical or structural engineer. Routinely monitor the damaged area for signs of settlement and seepage.

☐ l. _____

7. Downstream Slope: **(Typical Slope ± IV : 2H)**

Access: ☐ lower roadway along toe ☐ roadway to outlet works ☐ walkway to outlet works ☐ None Observed

Slope Protection: x None ☐ Dumped Rock ☐ Rip Rap ☐ Grouted Rip Rap ☐ Concrete

Erosion: ☐ Loose soil w/ little vegetation ☐ Rut (<6") x Gully (>6" deep) ☐ Not Visible ☐ None Observed

Description: Moderate erosion noted along the right groin.

Cracks: ☐ Parallel with crest ☐ Perpendicular to crest ☐ Slide visible ☐ Not Visible x None Observed

Description: _____

Sinkholes: ☐ _____ in. Wide x _____ in. Long x _____ in. Deep ☐ Not Visible x None Observed

Description: _____

Vegetation: ☐ None ☐ Low Ground Cover x Bushes or Tall Grass x Trees # many X <6" and x >6" & <20" ☐ >20"

Description: Extensive tree growth with exposed roots, ground cover.

Seepage: Seep Spot Number 1

☐ Green Vegetation x Wet or Muddy Ground ☐ Ponding Water ☐ Not Visible ☐ None Observed

X Flowing, Description: Numerous seepage areas observed at horizontal drain pipe locations.

Water Clarity: x Clear ☐ Some particle ☐ Muddy ☐ Other:

Description: _____

Seep Spot Number 2

☐ Green Vegetation x Wet or Muddy Ground ☐ Ponding Water ☐ Not Visible ☐ None Observed

X Flowing, Description: seepage emerging through "rockfill" toe at downstream toe

Water Clarity: x Clear ☐ Some particles ☐ Muddy ☐ Other: _____

Description: _____

Findings:

☐ a. The downstream slope was not inspected.

☐ b. The downstream slope appeared to be in satisfactory condition, no corrective actions are required at this time.

x c. The downstream slope appeared to be in fair to poor condition and requires corrective action.

☐ d. The downstream slope appeared to be in unsatisfactory condition and not expected to fulfill its intended function. Urgent corrective action is required.

Corrective Actions:

☐ e. Slope protection needs maintenance or repair. Description: _____

x f. Rut and/or Gully erosion was observed on the slope, which requires maintenance and/or repair. Description: Gully erosion observed along right groin area should be backfilled with compacted soil/rock.

☐ g. A crack was observed on the slope, which requires further investigation to determine the underlining cause. Monitor the area and/or repair as required.

☐ h. A sinkhole was observed on the slope, which requires further investigation to determine the underlining cause. Repair and monitor the area.

x i. The down stream slope was not visible due to high grass and bush vegetation. Clear high vegetation and maintain low to enable easy visual inspection.

x g. Tree(s) were observed on the downstream slope. Trees have been identified as the probable cause of piping failures, and can possibly cause severe damage to the embankment if they are uprooted during high winds. Corrective action is required to remove the tree hazards from the dam. Acceptable remedies include removal of the tree and its root structure down to a 2" diameter and reconstructing the damaged embankment section. All repair work shall be accomplished as per the requirements of licensed geotechnical or structural engineer. Routinely monitor the damaged area for signs of settlement and seepage.

x h. Seepage water was observed. Monitor and conduct further investigation to locate the source of water and extent of any possible hazardous or developing condition.

x i. Seepage was observed flowing and particles were observed to be removed by the flow. Take immediate action to stop the loss of soil from the embankment. Conduct further investigation to determine the underlining cause and take corrective action. Monitor the area.

☐ j. The slope was very steep, around a 1 to 1 slope, further study is required to verify slope stability.

x k. A Weir (V-notch, Parshall flume, etc.) should be installed to monitor rate or volume of seepage with reservoir (pool) elevation.

8. Abutments/Toe:

Erosion: ☐ Loose soil w/ little vegetation x Rut (<6") ☐ Gully (>6" deep) ☐ Not Visible ☐ None Observed

Description: Minor "rilling" noted primarily at abutment-embankment contact areas.

Cracks: ☐ Parallel with crest ☐ Perpendicular to crest ☐ Slide visible ☐ Not visible x None Observed

Descripton: _____

Vegetation: ☐ None ☐ Low Ground Cover xBushes or Tall Grass xTrees # many X <6" and X >6" & <20" ☐ >20"

Description: Extensive vegetation & tree growth observed along abutments & D/S toe.

Seepage: Seep Spot Number 1

☐ Green Vegetation xWet or Muddy Ground ☐ Ponding Water ☐ Not Visible ☐ None Observed

☐ Flowing, Description: Seepage observed along D/S toe, emerging from rockfill toe.

Water Clarity: X Clear ☐ Some particles ☐ Muddy ☐ Other: _____

Description: _____

Seep Spot Number 2

☐ Green Vegetation ☐ Wet or Muddy Ground ☐ Ponding Water ☐ Not Visible ☐ None Observed

☐ Flowing, Description: _____

Water Clarity: ☐ Clear ☐ Some particles ☐ Muddy ☐ Other: _____

Description: _____

Findings:

☐ a. The abutments/toe were not inspected.

☐ b. The abutments/toe appeared to be in satisfactory condition, no corrective actions are required at this time.

X c. The abutments/toe appeared to be in fair to poor condition and requires corrective action.

☐ d. The abutments/toe appeared to be in unsatisfactory condition and not expected to fulfill its intended function. Urgent corrective action is required.

Corrective Actions:

☐ e. Slope protection needs maintenance or repair. Description: _____

☐ f. Rut and/or Gully erosion was observed, which requires maintenance and/or repair. Description: _____

☐ g. A crack was observed along the abutments/near the toe, which requires further investigation to determine the underlining cause. Monitor the area and/or repair as required.

X h. The abutment/toe area was not visible due to high grass and bush vegetation. Clear high vegetation and maintain low to enable easy visual inspection.

x i. Tree(s) were observed along the abutment/toe. Trees have been identified as the probably cause of piping failures, and can possibly cause sever damage to the embankment if they are uprooted during a high winds. Corrective action is required to remove the tree hazards from the dam. Acceptable remedies include removal of the tree and its root structure down to a 2" diameter and reconstructing the damaged embankment section. All repair work shall be accomplished as per the requirements of licensed geotechnical or structural engineer. Routinely monitor the damaged area for signs of settlement and seepage.

x j. Seepage water was observed. Monitor and conduct further investigation to locate the source of water and extent of any possible hazardous or developing condition.

☐ k. Seepage was observed flowing and particles were observed to be removed by the flow. Take immediate action to stop the loss of soil from the embankment. Conduct further investigation to determine the underlining cause and take corrective action. Monitor the area.

☐ l..

A Weir (V-Notch, Parshall Flume, etc.) should be installed to monitor rate or volume of seepage with reservoir (pool) elevation.

9. Outlet Works:

Culvert / Pipe

Type / Size: _____

Culvert: ☐ Concrete ☐ Masonry ☐ unlined earth ☐ Other _____

Pipe: ☐ DIP ☐ Corrugated Metal ☐ PVC ☐ HDPE ☐ Concrete ☐ Other _____

Control Type: ☐ Gate ☐ Valve ☐ Other _____

Location: ☐ Control on Upstream side ☐ Control on Downstream side

Seepage: ☐ Green Vegetation ☐ Wet or Muddy Ground ☐ Ponding Water ☐ Not Visible ☐ None Observed

☐ Flowing, Description: _____

Water Clarity: ☐ Clear ☐ Some particles ☐ Muddy ☐ Other: _____

Description: _____

Findings:

x a. The outlet works were not inspected.

☐ b. The outlet works were not tested.

☐ c. The outlet works appeared to be in satisfactory condition, no corrective actions are required at this time.

☐ d. The outlet works appeared to be in fair to poor condition and requires corrective action.

☐ e. The outlet works appeared to be in unsatisfactory condition and not expected to fulfill its intended function. Urgent corrective action is required.

Corrective Actions:

☐ f. Seepage/Ponding water was observed. Conduct further investigation to locate the source of water and extent of any possible hazardous or developing condition.

☐ g. Seepage was observed flowing and particles were observed to be removed by the flow. Take immediate action to stop the loss of soil. Conduct further investigation to determine the underlining cause and take corrective action. Monitor the area. Failures caused by seepage/piping along the outlet conduit are very common and are considered to be a dangerous situation.

☐ h. Were not visible due to high grass and bush vegetation. Clear high vegetation and maintain low to enable easy visual inspection.

☐ i. Tree(s) were observed on the dam embankment. Trees have been identified as the probably cause of piping failures, and can possibly cause sever damage to the embankment if they are uprooted during a high winds. Corrective action is required to remove the tree hazards from the dam. Acceptable remedies include removal of the tree and its root structure down to a 2” diameter and reconstructing the damaged embankment section. All repair work shall be accomplished as per the requirements of licensed geotechnical or structural engineer. Routinely monitor the damaged area for signs of settlement and seepage.

☐ j. _____

10. Spillway:

Type: ☐ None ☐ Culvert/Pipe X Channel

Description: Concrete chute spillway.

Dimension: _____ ft. Invert elevation: 1599.0 ft. per construction drawings

Slope Protection: ☐ None ☐ Grass ☐ Dumped Rock ☐ Fitted Rip Rap ☐ Grouted Rip Rap x Concrete

☐ Defect in Protection: Description: _____

Approach: ☐ Clear x High Veg. X Trees ☐ Other: _____

Erosion: ☐ Scour ☐ Gully ☐ Headcut x Not Observed ☐ Other: _____

Description: _____

Vegetation: ☐ None ☐ Low Ground Cover X Bushes or Tall Grass X Trees #_____ X <6" ☐ >6" & <20" ☐ >20"

Description: Ironwood trees observed on the spillway_____

Findings*:*

x a. The Spillway appeared to be in satisfactory condition, no corrective actions are required at this time.

☐ b. The Spillway appeared to be in fair to poor condition and requires corrective action.

☐ c. The Spillway appeared to be in unsatisfactory condition and not expected to fulfill its intended function. Urgent corrective action is required.

Corrective Actions:

☐ d. Slope protection needs maintenance or repair. Description:_____

x e. The spillway approach was blocked. Clear approach.

☐ f. Severe scour erosion was observed which requires maintenance and/or repair.
Description:_____

☐ g. A headcut was observed downstream of the spillway. Corrective / mitigative action is required to prevent this problem from moving upstream.

x h. Trees are unacceptable in the spillway channel and approach. Take corrective action to address the woody vegetation problem and repair the damaged area.

x i. Unclear if spillway is adequately sized. Spillway should pass the probable maximum flood. Verify spillway capacity and take corrective action as required.

☐ j. _____

11. Down Stream Channel:

Name: _____

Downstream: ☐ Sump ☐ Open Area ☐ Un-Defined Drainage-way ☐ Defined Drainage-way ☐ Other _____

Items along Stream Bank: ☐ None ☐ Road ☐ Houses ☐ Town x Not Inspected

Description: _____

Findings:

x a. The downstream channel was not inspected.

☐ b. The downstream channel appeared to be in satisfactory condition, no corrective actions are required at this time.

☐ c. The downstream channel appeared to be in fair to poor condition and requires corrective action.

☐ d. The downstream channel appeared to be in unsatisfactory condition and not expected to fulfill its intended function. Urgent corrective action is required.

Corrective Actions:

☐ e. _____

Additional Comments:

On the date of this limited visual inspection, there appeared to be no immediate threat to the safety of the dam. No assurance can be made regarding the dam's condition after this date. Subsequent adverse weather and other factors may affect the dam's condition.

- . The slopes should be clear and visible for inspection. The existing trees have been allowed to grow so large in some cases that there is concern that seepage and piping (i.e. internal erosion) along root systems may develop. There is additional concern that cutting and killing the trees will lead to rotten roots and greater potential for such seepage and piping . A more in depth evaluation of the condition should be performed to determine how best to remediate the condition.

-. A path or roadway along the groins, the toe and to the outlet discharge point should be cleared and maintained to facilitate periodic inspection, maintenance, monitoring of seepage conditions, and remediation, if required,

- A V-notch, Parshall flume, etc., should be installed along or near the downstream toe of the dam to collect & monitor/measure the rate or volume of seepage with respect to changes (i.e. increase & decrease) in reservoir (pool) elevation.

- A large "gully", located in the south abutment and approximately 140 feet from the reservoir, was observed. This "gully" is approximately 130 feet deep and appears to have been quarried. There were at least two recent debris falls in the "gully". A recent notch in the upper right corner of the gully also shows debris fall activity. Water was observed flowing from this notch and down the face of the gully. The amount of flow was estimated to be 20 gpm – 50 gpm. Flow from the notch should be monitored since the source of the flow is not known or if it is related to the reservoir. In addition, a relatively large rock slide, located adjacent to the above gully, was also observed and appears to have been caused by the recent heavy rainfalls. This rock slide does not pose a threat to the safety of the dam. This rock slide area should continue to be monitored.

Limitations and Intent of this Dam Safety Inspection:

This Dam Safety Inspection was conducted to assess the general overall condition of the reservoir/dam, identify visible deficiencies, and recommend areas of for monitoring, additional investigative studies and corrective actions. The inspection is based only on visible features/areas of the dam on the day of inspection. This inspection is not a formal phase I or phase II dam safety inspection and does not include a review or evaluation from each specialist of an inspection team, such as a geologists, civil, geotechnical, structural, or hydraulics engineer. The owner should verify the findings of this report and take corrective actions. The owner may submit to the State alternative corrective actions that are certified by a licensed professional engineer in the State of Hawaii experienced in the design and construction of dams. This inspection does not relieve the owner/operator from their responsibility to conduct routine inspections, maintenance, repairs, modifications, monitoring, documentation, and/or investigative studies. The inspection was conducted under the authority of the Hawaii Revised Statures Chapter 179D, and Hawaii Administrative Rules, Title 13, Chapter 190, titled "Dams and Reservoirs". Questions regarding this inspection should be forwarded to the Hawaii State Dam Safety Program; PO Box 373; Honolulu, Hawaii 96809; Ph. (808) 587-0236.

Photo of reservoir area. Dam and spillway located at top right corner of photo.

Aerial Photo of reservoir area and concrete chute spillway shown in bottom half of photo.

Photo taken from spillway crest looking downstream at discharge channel.

Photo taken of access road to dam crest from left abutment.

Aerial photo of dam crest (center), U/S (right) & D/S (left) slopes and spillway (top). Note extensive vegetation, including tall grass, brush, shrubs, and large trees.

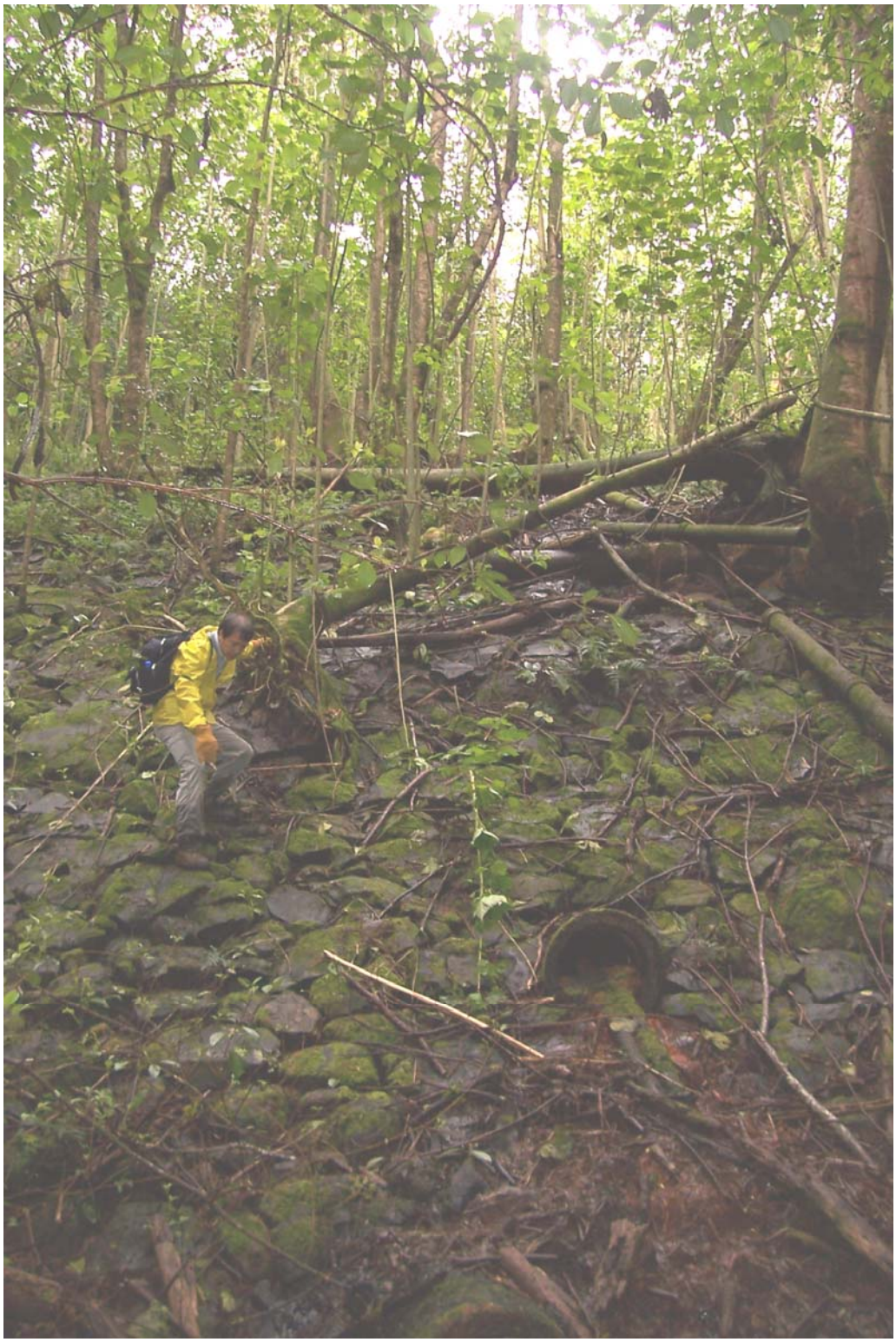

Photo of D/S slope, rock fill toe drain, and horizontal drain pipes.

Photo of horizontal drain pipe and flow (seepage) from drain pipe.

Photo of two vertical metal standpipes on D/S slope. Standpipes appear to be possible pizometers. Note extensive vegetative growth on D/S slope.

Photo taken of presumed old access tunnel to outlet works gate chamber. Tunnel appears to be unlined.
Photo taken at outlet end of tunnel, which is located D/S of left abutment and near outlet works discharge channel.

Photo of outlet works concrete conduit and discharge channel, located along left abutment.

Photo taken of discharge channel, D/S of outlet works conduit. Photo shows location where discharge flows exceeded capacity of channel and overflowed into a side ditch.

Aerial photo of dam, reservoir, & rock slide area, located along left abutment. Deep “gully” area not visible due to tree growh.

Aerial Photo of landslide/rock slide area and deep “gully”. Photo is a closer view of above aerial photo.

Photo taken of deep “gully”(approx. 130 feet deep) and water flowing from erosion area at top of photo.

Photo taken of relatively large rock slide area. Photo is a close-up view of rock slide area noted in above aerial photo.

Close-up photo of eroded area near the top of the deep “gully’ noted in above photos. Water observed flowing from this area.

Photo taken of recent landslide, located further D/S of dam and reservoir. Landslide material blocked portion of D/S discharge channel. Note this landslide is further D/S of rock slide noted in above photos.

Photo of landslide debris, which blocked D/S discharge channel.

Photo taken of recent landslide area, located further downstream of dam and reservoir.